UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/000,415	11/02/2001	Thomas Kolze	13199US02	9101

23446 7590 04/19/2005

MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

EXAMINER	
KUMAR, PANKAJ	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/000,415	KOLZE ET AL.	
	Examiner	Art Unit	
	Pankaj Kumar	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11-16 and 18-20* is/are rejected.

7)☒ Claim(s) *10 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/8/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 6, 14 are objected to because of the following informalities: they recite "determining a distance between the at least symbol" and it should probably be 'determining a distance between the at least one symbol'.

2. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 11, 12, 13, 15, 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen USPN 5,751,725. Here is how the reference teaches the claims:

5. As per claim 11: A method of impairment mitigation in a communications system comprising: generating at least one error estimate of a signal (Chen fig. 3: SER is symbol error rate) received from a channel (Chen fig. 1: channel 18 to 20); determining if the channel is degraded based on the at least one error estimate (Chen fig. 3 126, 132: if SER is greater than max SER, then the rate in 128, 134 will not be determined since it is degraded); erasing a select symbol of the signal if the channel is degraded (Chen fig. 2 132, 126: if the SER is above max symbol error rate, it is marked as being erased since the channel is degraded as reflected by the

high SER; col. 7 lines 52-53: outputs no frame if an erasure is declared; col. 7 lines 24-36: if erasure is not declared, it would output noise); and decoding the signal (Chen fig. 1: 30).

6. As per claim 12: The method of claim 11 further comprising keeping the select symbol if the channel is not degraded (Chen fig. 3 126, 132: if SER is not above max SER which is an indication that the channel is acceptably not degraded, the symbol is kept in order to determine the rate in 128, 134).

7. As per claim 13: The method of claim 11 further comprising decoding the signal (Chen fig. 1: 30) and encoding the signal (Chen fig. 1: 10) before generating the at least one error estimate (Chen fig. 1: 10 and 30 occur before 32, 34).

8. As per claim 15: The method of claim 11 wherein the signal comprises at least one symbol, and wherein determining whether the channel is degraded comprises: comparing the at least one error estimate to at least one predetermined threshold (Chen fig. 3 126, 132: SER compared against max SER).

9. As per claim 16: The method of claim 15 wherein the channel is degraded if the at least one error estimate is above the at least one predetermined threshold (Chen fig. 3 126, 132, 130: if SER is above max SER then channel is degraded is indicated by the symbol being marked for erasure).

Claim Rejections - 35 USC § 103

10. Claims 1, 2, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu USPN 5,406,593 in view of Merriam Webster's Collegiate Dictionary. Here is how the references teach the claims:

11. As per claim 1: A method of impairment mitigation in a communications system comprising: generating at least one error estimate of a signal (Chennakeshu fig. 1: 4a,b; fig. 3: 32 calculate signal to impairment ratio (SIR) and thus impairment is the error estimate), determining a channel fidelity metric using the at least one error estimate (Chennakeshu fig. 1: 4a,b; fig. 3: 32 calculate signal to impairment ratio (SIR) and thus this ratio is the claimed metric; col. 8 line 57: SIR metrics); and decoding the signal using the channel fidelity metric (Chennakeshu fig. 1: 7; fig. 3: 29 decoder uses SIR calculation).

12. Chennakeshu does not teach fidelity. Webster's dictionary teaches fidelity as being an accuracy in details in definition 1b under fidelity on page 432. Chennakeshu's signal to impairment ratio is a measure of accuracy in details. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the fidelity as recited by the instant claims, because the combined teaching of Chennakeshu with Webster's dictionary suggests fidelity as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu with Webster's dictionary because Chennakeshu suggests measure of impairment (something broad) in general and Webster's dictionary suggests having fidelity provides the beneficial use of having accuracy in details in the analogous art of accuracy or error estimate.

13. As per claim 2: The method of claim 1 wherein the signal comprises one of at least one digital sample or at least one symbol (Chennakeshu 5406593 col. 2 line 33: bits/symbols).

14. As per claim 18: A method of impairment mitigation in a communications system comprising: generating at least one error estimate of a signal (Chennakeshu fig. 1: 4a,b; fig. 3: 32 calculate signal to impairment ratio (SIR) and thus impairment is the error estimate); determining

a channel fidelity metric using the at least one error estimate (Chennakeshu fig. 1: 4a,b; fig. 3: 32 calculate signal to impairment ratio (SIR) and thus this ratio is the claimed metric; col. 8 line 57: SIR metrics); generating a branch metric for a decoder (Chennakeshu col. 10 lines 48-53; eq. 5); modifying the branch metric based on the channel fidelity metric (Chennakeshu eq. 5 branch metric is modified based on SIR; col. 10 lines 51-53), and decoding the signal using the modified branch metric (Chennakeshu col. 10 lines 66, 48-51, 51-67).

15. Chennakeshu does not teach fidelity. Webster's dictionary teaches fidelity as being an accuracy in details in definition 1b under fidelity on page 432. Chennakeshu's signal to impairment ratio is a measure of accuracy in details. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the fidelity as recited by the instant claims, because the combined teaching of Chennakeshu with Webster's dictionary suggests fidelity as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu with Webster's dictionary because Chennakeshu suggests measure of impairment (something broad) in general and Webster's dictionary suggests having fidelity provides the beneficial use of having accuracy in details in the analogous art of accuracy or error estimate.

16. As per claim 19: The method of claim 18 wherein the decoder is a Viterbi decoder (Chennakeshu col. 10 lines 48-49).

17. Claims 3, 4, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu in view of Webster's as applied to claim 2 above, and further in view of Balachandran USPN 6,215,827. Here is how the references teach the claims:

18. As per claim 3: The method of claim 2 further comprising storing the channel fidelity metric (not in Chennakeshu but Chennakeshu 5406593 does teach averaging SIR col. 2 lines 51-52 which would involve storing the prior SIR. Balachandran 6215827 teaches storing in fig. 12: 218.). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the storing as recited by the instant claims, because the combined teaching of Chennakeshu in view of Webster's with Balachandran suggest storing as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu in view of Webster's with Balachandran because Chennakeshu in view of Webster's suggests averaging the SIR (something broad) in general and Balachandran suggests the beneficial use of storing such as being able to recall the prior values in order to average them with the current value in the analogous art of measuring or estimating quality of impairment.

19. As per claim 4: The method of claim 3 further comprising determining a transmit waveform using the stored fidelity metric (Chennakeshu fig. 1: determining by selecting a transmit signal that will be decoded where the determination occurs based on the SIR).

20. As per claim 5: The method of claim 3 further comprising selecting a receiver algorithm using the stored fidelity metric (Chennakeshu fig. 1: selecting between receiver algorithms of 2a and 3a against 2b and 3b using the metric).

21. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu in view of Webster's as applied to claim 1 above, and further in view of Olafsson USPN 5,910,959. Here is how the references teach the claim:

22. As per claim 6: Chennakeshu in view of Websters's teaches the method of claim 1 wherein the signal comprises at least one symbol (Chennakeshu 5406593 col. 2 line 33: bits/symbols) and wherein generating at least one error estimate (Chennakeshu fig. 1: 4a,b; fig. 3: 32 calculate signal to impairment ratio (SIR) and thus impairment is the error estimate). What Chennakeshu does not teach is determining at least one constellation point closest to the at least one symbol; determining a distance between the at least symbol and the at least one constellation point; and squaring the distance. What Olafsson teaches is determining at least one constellation point (Olafsson 5910959 col. 6 lines 12-13, 22) closest to the at least one symbol (Olafsson col. 4 lines 49-50, 52-53); determining a distance between the at least symbol and the at least one constellation point (Olafsson col. 4 lines 49-50, 52-53); and squaring the distance (Olafsson col. 4 lines 49-50, 52-53). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the determining at least one constellation point closest to the at least one symbol; determining a distance between the at least symbol and the at least one constellation point; and squaring the distance as recited by the instant claims, because the combined teaching of Chennakeshu in view of Websters's with Olafsson suggest determining at least one constellation point closest to the at least one symbol; determining a distance between the at least symbol and the at least one constellation point; and squaring the distance as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu in view of Websters's with Olafsson because Chennakeshu in view of Websters's suggests decoding (something broad) in general and Olafsson suggests the beneficial use of decoding with constellation (Olaffsson col. 6 lines 7-18)

such as to correct errors where signals are modulated on to a constellation in the analogous art of trellis.

23. Claims 7, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu in view of Webster's as applied to claim 1 above, and further in view of Tiedemann USPN 5,604,730. Here is how the references teach the claims:

24. As per claim 7: Chennakeshu in view of Websters's teaches the method of claim 1 wherein the signal comprises at least one symbol, and determining a channel fidelity metric. Chennakeshu in view of Websters's does not teach comparing the at least one error estimate to at least one predetermined threshold. Tiedemann teaches comparing the at least one error estimate to at least one predetermined threshold (Tiedemann 5604730 fig. 1: 125 comparing error estimate Eb/Io with desired or threshold Eb/Io; 100, 105, 115, 120). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the comparing the at least one error estimate to at least one predetermined threshold as recited by the instant claims, because the combined teaching of Chennakeshu in view of Websters's with Tiedemann suggest comparing the at least one error estimate to at least one predetermined threshold as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu in view of Websters's with Tiedemann because Chennakeshu in view of Websters's suggests signal impairment ratio (something broad) in general and Tiedemann suggests the beneficial use of comparing the ratio to a threshold in order to increase or decrease power for better communication and saving energy in the analogous art of communication.

25. As per claim 8: The method of claim 7 further comprising generating a first indication if the at least one error estimate is above the at least one predetermined threshold (Tiedemann fig. 1: yes output of 125, 130) and a second indication if the at least one error estimate is not above the at least one predetermined threshold (Tiedemann fig. 1: no output of 125, 135, 140).

26. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu in view of Websters's with Tiedemann as applied to claim 7 above, and further in view of Chen USPN 5,751,725. Here is how the references teach the claim:

27. As per claim 9: Chennakeshu in view of Websters's with Tiedemann teach the method of claim 7. Chennakeshu in view of Websters's with Tiedemann does not teach keeping a select symbol if the at least one error estimate is below the at least one predetermined threshold, and erasing the select symbol if the at least one error estimate is above the at least one threshold. Chen teaches keeping a select symbol (Chen 5751725 fig. 2: 104 yes, 108, 126 no, 128, 132 no, 134) if the at least one error estimate is below the at least one predetermined threshold (Chen fig. 2: keeps for performing another check 108 when 1 CRC checks; keeps for determining the rate in 128, 134), and erasing the select symbol (Chen fig. 2: 104 no, 106, 130; col. 7 lines 52-53: outputs no frame if an erasure is declared) if the at least one error estimate is above the at least one threshold (Chen fig. 2 132, 126: if the SER is above max symbol error rate, it is marked as being erased; col. 7 lines 52-53: outputs no frame if an erasure is declared). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the keeping a select symbol if the at least one error estimate is below the at least one predetermined threshold, and erasing the select symbol if the at least one error estimate is above the at least one

threshold as recited by the instant claims, because the combined teaching of Chennakeshu in view of Websters's with Tiedemann with Chen suggest keeping a select symbol if the at least one error estimate is below the at least one predetermined threshold, and erasing the select symbol if the at least one error estimate is above the at least one threshold as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu in view of Websters's with Tiedemann with Chen because Chennakeshu in view of Websters's with Tiedemann suggests thresholding (something broad) in general and Chen suggests the beneficial use of keeping and erasing based on the threshold such as being able to determine the communication rate of the system in the analogous art of communication.

28. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen USPN 5,751,725 as applied to claim 11 and further in view of Olafsson. Here is how the references teach the claim:

29. As per claim 14: Chen teaches the method of claim 11 wherein the signal comprises at least one symbol and generating at least one error estimate (Chen fig. 3: SER deals with symbol). Chen does not teach determining at least one constellation point closest to the at least one symbol; determining a distance between the at least symbol and the at least one constellation point; and squaring the distance. Olafsson teaches determining at least one constellation point (Olafsson 5910959 col. 6 lines 12-13, 22) closest to the at least one symbol (Olafsson col. 4 lines 49-50, 52-53); determining a distance between the at least symbol and the at least one constellation point (Olafsson col. 4 lines 49-50, 52-53); and squaring the distance (Olafsson col.

4 lines 49-50, 52-53). Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the determining at least one constellation point closest to the at least one symbol; determining a distance between the at least symbol and the at least one constellation point; and squaring the distance as recited by the instant claims, because the combined teaching of Chen with Olafsson suggest determining at least one constellation point closest to the at least one symbol; determining a distance between the at least symbol and the at least one constellation point; and squaring the distance as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chen with Olafsson because Chen suggests decoding (something broad) in general and Olafsson suggests the beneficial use of decoding with constellation (Olaffsson col. 6 lines 7-18) such as to correct errors where signals are modulated on to a constellation in the analogous art of decoding.

30. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chennakeshu in view of Websters's as applied to claim 18 above, and further in view of Goodson USPN 6,760,385. Here is how the references teach the claim:

31. As per claim 20: Chennakeshu in view of Webster's teaches the method of claim 18. Chennakeshu in view of Webster's does not teach setting the branch metric to a low probability if the fidelity metric indicates a degraded channel although Chennakeshu does teach in col. 10 lines 57-58 that its adaptable branch metric varies with channel quality. Goodson 6760385 teaches to drop the lower quality branch (Goodson col. 7 lines 40-45). It is common knowledge that when the channel quality is degraded, the branch responsible for the degradation should be

set to low probability so that it can be removed and quality can increase. Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to arrive at the setting the branch metric to a low probability if the fidelity metric indicates a degraded channel as recited by the instant claims, because the combined teaching of Chennakeshu in view of Webster's with Goodson suggest setting the branch metric to a low probability if the fidelity metric indicates a degraded channel as recited by the instant claims. Furthermore, one of ordinary skill in the art, would have been motivated to combine the teachings of Chennakeshu in view of Webster's with Goodson because Chennakeshu in view of Webster's suggests adaptable branch metric varies with channel quality (something broad) in general and Goodson suggests the beneficial use of adapting the branch metric such that it is set to a low probability by dropping it so that the probability of obtaining the correct data can increase in the analogous art of improving error rate.

Allowable Subject Matter

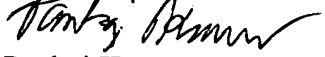
32. Claims 10 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pankaj Kumar whose telephone number is (571) 272-3011. The examiner can normally be reached on Mon, Tues, Thurs and Fri after 8AM to after 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Pankaj Kumar
Patent Examiner
Art Unit 2631

PK